

INSTALLATION & PROGRAMMING MANUAL

ISM4

INTELLIGENT SYSTEM MANAGER



xantech®

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INTRODUCTION

Congratulations and thank you for purchasing the Xantech ISM4 Intelligent System Manager. The ISM4 is the answer to the age old problem of simply and inexpensively keeping Home Entertainment System devices in sync.

The ISM4 can sync up to four IR controlled devices when referenced to one of those devices, typically a Video Monitor, Home Theater A/V Receiver or Whole House Audio/Video Entertainment System Controller. All four system devices are referenced to the ISM4 via Xantech Sensing Modules. There are 6 different sensors that can be used to detect voltage, contact closure, video, audio, light or current. When the System Reference Device is turned ON, the ISM4 will detect the change of state for the referenced device (from OFF to ON) and 'look' at the state of the other devices. If any or all are OFF, the ISM4 will automatically output IR Commands to turn those devices ON for proper system sync.

The ISM4 Processor constantly scans the Sense Inputs, whether any of the system devices are ON or not. This serves multiple purposes. First, when the System Reference Device is ON, it keeps the other system devices ON. That doesn't just mean at the initial power up, but for as long as the reference device is ON. Some devices such as DVD players will time out after a certain period of inactivity. If a device were to time out or otherwise turn OFF, (as long as the System Reference Device is ON) when the ISM4 Processor scans the Sense Inputs, if any device is OFF the ISM4 will output the proper IR Command to turn the device ON and restore proper system sync.

The opposite is also true. If the System Reference Device is OFF and the ISM4 detects any of the other three devices are ON, the ISM4 will output the proper IR Command(s) and turn it/them OFF to restore proper system sync.

In addition to issuing power commands to maintain sync, each device can have a macro of up to five IR Commands and Delays associated with the sync mechanism so anytime a device is synced to the system, a default mode for each device (and ultimately the system) can be implemented. This allows the reference device to be set to a specific input at specific volume and audio mode (depending upon device capability). Sources can be set to Play (DVD/CD, Media Servers, etc) or tune to a specific channel (Cable, Satellite, XM, Sirius, AM/FM).

There is no special remote or keypad required to activate the ISM4. It will automatically respond to the status of the System Reference Device to sync the other system devices. However, the ISM4 can be controlled via IR. For IR control, the ISM4 responds to Xantech RC68 Commands. Any programmable controller that can learn RC68 Commands can be used with an ISM4. There is an IR Control Input that can be integrated with most IR repeater systems and an IR Receiver Jack that is compatible with any Xantech IR Receiver with a stereo mini plug. (291 Series or 'Dash 30' Type 480-30, 490-30 etc). The IR Inputs will also pass through IR Commands, allowing direct control of the system devices, so typically no additional connecting block or other IR system components are required.

The RS232 Protocol allows for a bi-directional interface between the ISM4 and the RS232 Control Device. Incoming ASCII Text Commands can be associated with IR Commands for Discrete ON/OFF or Toggle Power of the System Reference Device, Query Source Power State and request general System Info. The ISM4 will return an ASCII Text Status Message to the control device for use as system status indication or other logic as implemented per system design.

The ISM4 is a stand-alone programmed device and does not require any programming software for setup. A simple, logical progression of IR Code Learning is used with each step prompted by the Front Panel LED's. Specific LED modes indicate which Source macro is being programmed right down to which step in the macro, and how many seconds are in the delay. All programming can be tested right from the ISM4 while learning for individual code confirmation or when programming is complete for system function confirmation. ISM4 Programming can be cloned from one unit to another via the RS232 Port on the Rear Panel.

Multiple ISM4 Modules can be linked for expansion in systems with more than four devices. All devices will be synced to the System Reference Device on the Primary Module.

Xantech ISM4 – Intelligent System Management made simple.

ISM4 FEATURE DESCRIPTIONS

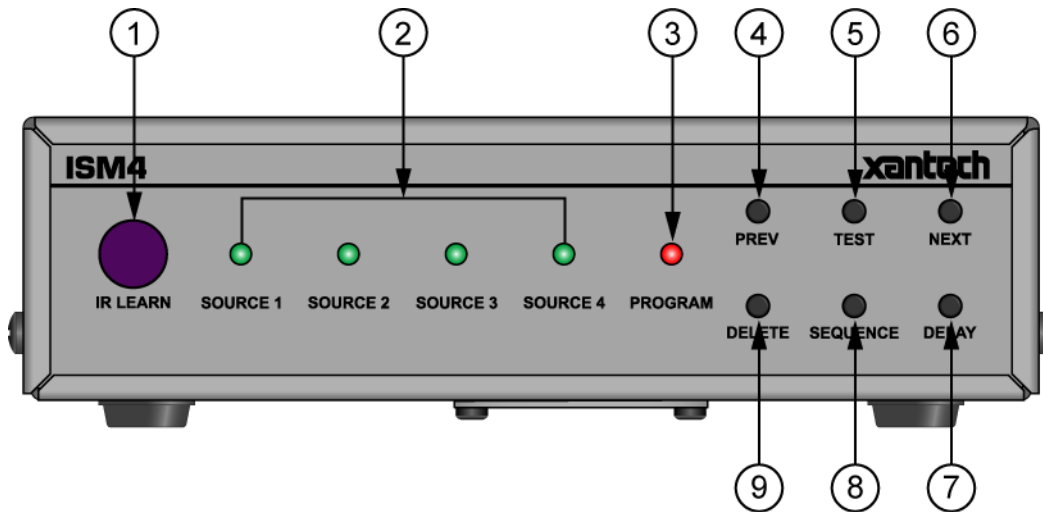


Figure 1 – ISM4 Front Panel Features

ISM4 FRONT PANEL FEATURES

- 1. IR Learning Eye.** The IR Learning Eye allows teaching IR Commands to the ISM4 for programming Source ON and OFF Macros and Command Structures.
- 2. Source 1-4 LED's.** These LED's are primarily used to indicate the sensed state of a corresponding system device (Source 1-4). When a sensed device is ON, the LED for that device will illuminate solid green. When that device is OFF the LED will be OFF. A Source LED will flash green when the ISM4 is outputting IR for that source. These LED's will also illuminate individually during IR Programming to indicate which device the IR Commands being learned are being associated with. Several of the function buttons on the front panel are capable of launching different functions based on the current programming state and the duration of the button press. The allowed elapsed times are; 1 second, 2 seconds, 5 seconds and 10 seconds. To eliminate the burden on the programmer to have to keep track of time, the ISM4 will prompt the programmer when all but the 1 second elapsed time intervals have expired. This is true for all buttons that have time dependencies. Upon initiation of a press of a button with time dependencies, the unit starts tracking time. Upon crossing the 2 second threshold, the unit will quickly flash the current active SOURCE LED. If the button remains pressed beyond this point the unit continues to monitor elapsed time. After 5 seconds of continuously pressing the button, the current active SOURCE LED will blink once again. Finally after 10 seconds of a continuous press, the LED will blink a third time. Given that there is not time dependency that exceeds 10 seconds the unit starts to blink rapidly to indicate that the max time duration has been exceeded.
 - First Blink: 2 second elapsed time indication.
 - Second Blink: 5 second elapsed time indication.
 - Third Blink: 10 second elapsed time indication.
 - 4th + (Rapid Blink): Maximum Elapsed time exceeded indication
- 3. Program LED.** This LED will illuminate different colors during the progressive steps of Source Programming to indicate which Macro (by Source) is being programmed.

Normal Mode

- **LED Off** – Normal use mode. (Power Management)
- **Solid Red During IR Generation** – Retry Source ON or OFF Macro (up to five times).
- **Flash Red** – Flash at a rate of 1/3 of a second indicates that the unit is processing a long delay.

Edit Mode

- **Solid Green** – Program ON state Macro.
- **Solid Orange** – Program OFF state Macro.
- **Solid Red** – Program Error.

4. **Prev Button.** This button has multiple functions, depending upon ISM4 programming mode including: Navigate Backwards through Source ON/OFF Macros, Navigate Backwards through Macro Command Structures (individual commands and delays) within ON/OFF Macros, decrease individual Delay value, Exit Programming Mode and Initiate the Clone Process to copy the Macro Tables from one ISM4 to another ISM4.
5. **Test Button.** This button has three functions, depending upon the ISM4 programming mode including: Test Source Macro, Test Learned IR Command and Test Delay.
6. **Next Button.** This button has three functions, depending upon the ISM4 programming mode including: Navigate Forward through Source ON/OFF Macros, Navigate Forward through Macro Command Structures (individual commands and delays) within ON/OFF Macros and Increase individual delay value.
7. **Delay Button.** This button is used during Source ON/OFF Macro programming to allow setting a delay duration within a Command Structure.
8. **Sequence Button.** This button has multiple functions, depending upon the ISM4 programming mode including: Enter Source ON/OFF Macro Programming Mode, Enter IR Learn Mode, Save Learned IR and Save Delay Value.
9. **Delete Button.** This button has multiple functions, depending upon ISM4 programming mode including: Delete selected Source ON/OFF Macro, Delete Command Structure, Delete entire Macro Table (all macros), remove last unsaved Learned IR Command, Remove Delay from selected Command Structure.

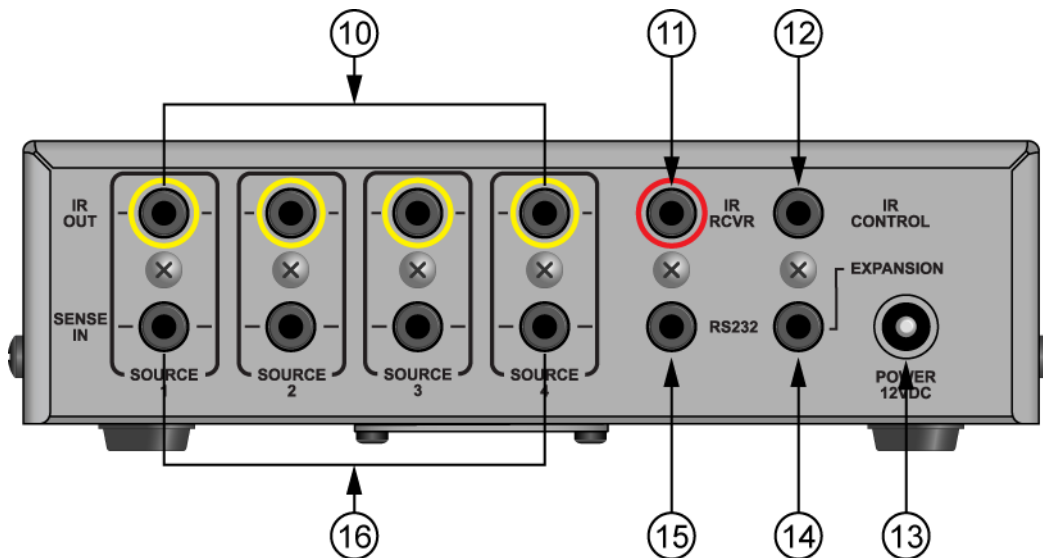


Figure 2 – ISM4 Rear Panel Features

ISM4 REAR PANEL FEATURES

10. **IR Out.** Four 2-circuit (mono) 3.5mm mini jacks connect to the IR Emitters for Sources 1-4.
11. **IR RCVR (IR Receiver Port).** One 3-circuit (stereo) 3.5mm mini jack connects to any Xantech IR Receiver with a stereo mini plug. (291 Series or 'Dash 30' Type 480-30, 490-30 etc). This jack provides 12 VDC to the

IR Receiver and receives IR signals from the receiver. IR signals input on this jack can control the ISM4 and pass through to control the individual sources via the Source 1-4 IR Outputs.

12. **IR Control.** One 2-circuit (mono) 3.5mm mini jack connects to a normal Emitter Output on an IR repeater system or IR Output on a system controller or A/V Receiver. IR signals input on this jack can control the ISM4 and pass through to control the individual sources via the Source 1-4 IR Outputs.
13. **Power.** 2.1mm coaxial jack connects to the included 12VDC 0.5A Power Supply (Xantech Part No 781ERGPS).
14. **Expansion.** One, 2-circuit (mono) 3.5mm mini jack connects to the Source 1 "Sense In" on a secondary ISM4 for system sync of three additional devices. When the Source 1 "Sense In" on the Primary ISM4 senses an ON state (12VDC), this jack outputs 12VDC to the Source 1 "Sense In" on the Secondary ISM4 to indicate the system ON state. The Source 2-4 devices on the Secondary ISM4 will then sync to the system as programmed (turn ON). When the Source 1 "Sense In" on the Primary ISM4 senses an OFF state (0VDC), this jack outputs 0VDC to the Source 1 "Sense In" on the Secondary ISM4 to indicate the system OFF state. The Source 2-4 devices on the Secondary ISM4 will then sync to the system as programmed (turn OFF).
15. **RS232.** One, 3-circuit (stereo) mini jack connects to the RS232 Output on a system control device such as an A/V Receiver, Whole House System Controller, etc. RS232 Commands Input on this port can trigger ISM4 IR output for Source 1 Power (discrete ON/OFF, toggle ON/OFF) as well as Query Source Power State and System info. This Port is bi-directional and will automatically send ISM4 System Status Info (Provided Automatic Source Power State Notifications are enabled. Refer to the RS232 Control and Programming section) when any Source state change has occurred or when queried by the RS232 control device.
16. **Sense In.** Four, 3-circuit (stereo) 3.5mm mini jacks connect to any of the Xantech SM Series Sensor Modules. The ON/OFF state for each of Sources 1-4 will be detected by a Sensor Module appropriate for that device, (i.e. SMVID01 Video Sensor for a DVD Player, SMVLT01 Voltage Sensor for a device with a 12V AC or DC output such as an A/V Receiver or Whole-House System Controller). Each "Sense In" Jack is associated with two IR Macros (ON/OFF) and a Source IR Output.

Before proceeding with this discussion, it is important to note that the Programming Procedure imposes a requirement on the Source 1 (System Reference Device) macros that it does not impose on any other macros. The requirement is as follows; on either the ON or the OFF Macros, the ISM4 assumes that the IR content (if programmed) of the first Command Structure (refer to the COMMAND STRUCTURES section for a thorough description of Command Structures) be a Power Command. It is left up to the programmer to ensure that this rule is strictly abided by. The problem is as follows; if the System Reference device is manually (or by Remote Control) turned on, the resulting transition on the System Reference Sense Input would be an Off-to-On transition. As a result, the ON Macro would be launched. Given that a Toggle Power command is present in the macro, the Reference device would immediately be turned off. Therefore, Toggle commands would not be permissible. The programmer would be limited to discrete type of Power IR ONLY. Unfortunately, Discrete IR commands are not as common as Toggle commands. To avoid this difficulty, the requirement stated above was imposed. For any "Sense In" transition detected by the ISM4 on the Source 1 (System Reference Input), the IR Content of the first Command Structure (containing a Power Command) will be bypassed. If a Delay is programmed, however, it will be processed. The end result is that regardless of whether or not a Toggle or a Discrete Power Command is present, the undesirable situation described above would not take place. Hence, the more prevalent Toggle Power commands can be utilized without any adverse effects at all. Please note that the IR content of Command Structure 1 is only bypassed during execution of a "Sense In" initiated macro on the Source 1 (System Reference) Input. On every other case, the full macro will be executed. For instance, if the trigger is a "Discrete Power On" RS232 (or IR) command, the entire macro would be executed. As a result, having executed the first Command Structure, the System Reference Device will be turned on as desired.

When Source 1 (System Reference Device) is turned ON, the Sensor Module for that device will show an ON state (+12V) to the Source 1 "Sense In". The first task that the ISM4 will take is to launch the ON Macro for Source 1. Based on the discussion above, the entire macro will be executed with the exception of the IR content of Command Structure 1. The ISM4 will then 'look' at the ON/OFF state of Sources 2-4. If any is sensed to be OFF, it will be turned ON utilizing its associated ON Macro. If at any time that Source 1 (System Reference Device) is ON, any of the other Sources is sensed to be OFF, the ISM4 will output the ON Macro associated with that device to sync it with the system. (System ON Mode)

When Source 1 (System Reference Device) is turned OFF, the Sensor Module for that device will show an OFF state (0V) to the Source 1 "Sense In". The first task that the ISM4 will take is to launch the OFF Macro for Source 1. Based on the discussion above, the entire macro will be executed with the exception of the IR content of Command Structure 1. The ISM4 will then 'look' at the ON/OFF state of Sources 2-4. If any is sensed to be ON, it will be turned OFF utilizing its associated OFF Macro. If at any time that Source 1 (System Reference Device) is OFF, any of the other Sources is sensed to be ON, the ISM4 will output the OFF Macro associated with that device to sync it with the system. (System OFF Mode)

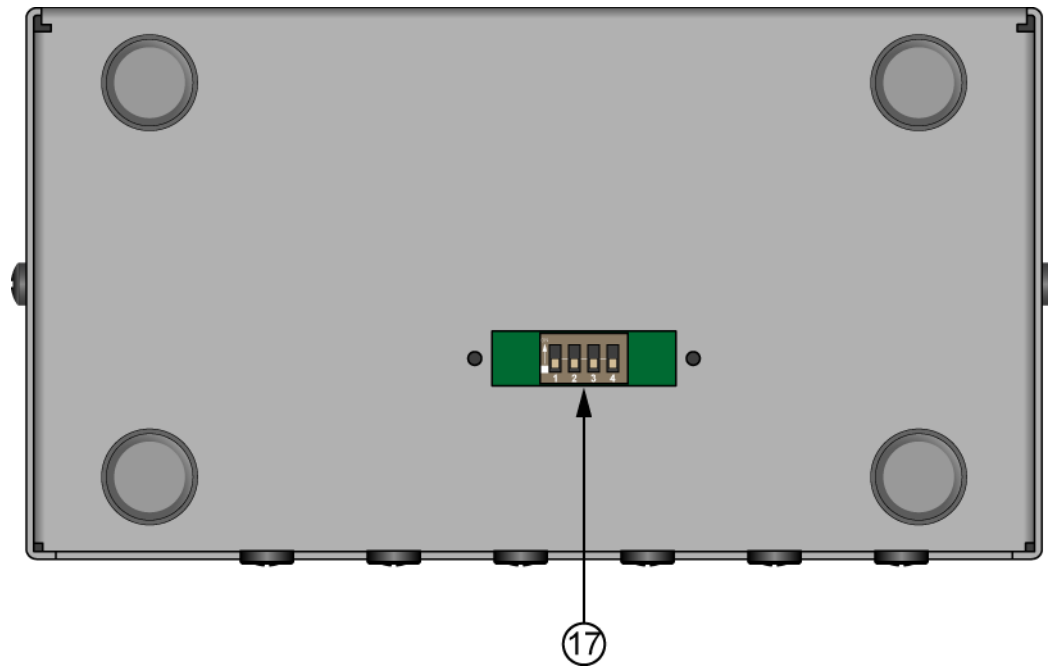


Figure 3 – ISM4 Bottom Panel Features – Cover Plate Removed

ISM4 BOTTOM PANEL FEATURES

17. DIP Switch. Four Position DIP Switch sets associated Source 1-4 IR Output signal strength. ON = low output (470 ohm resistor) OFF = high output (100 ohm resistor).

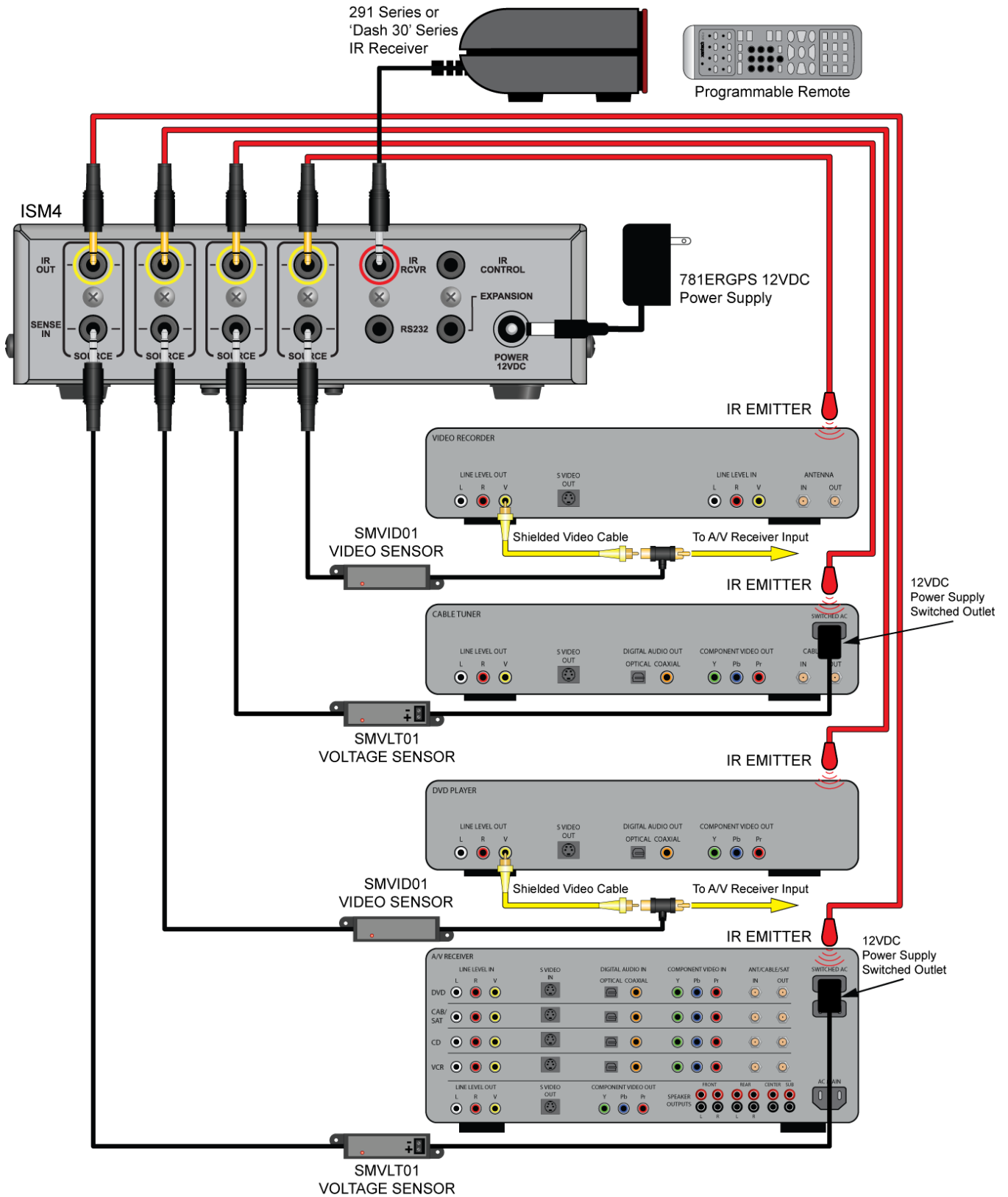


Figure 4 – Typical ISM4 System – AV Receiver Triggered Home Theater/IR Receiver Input

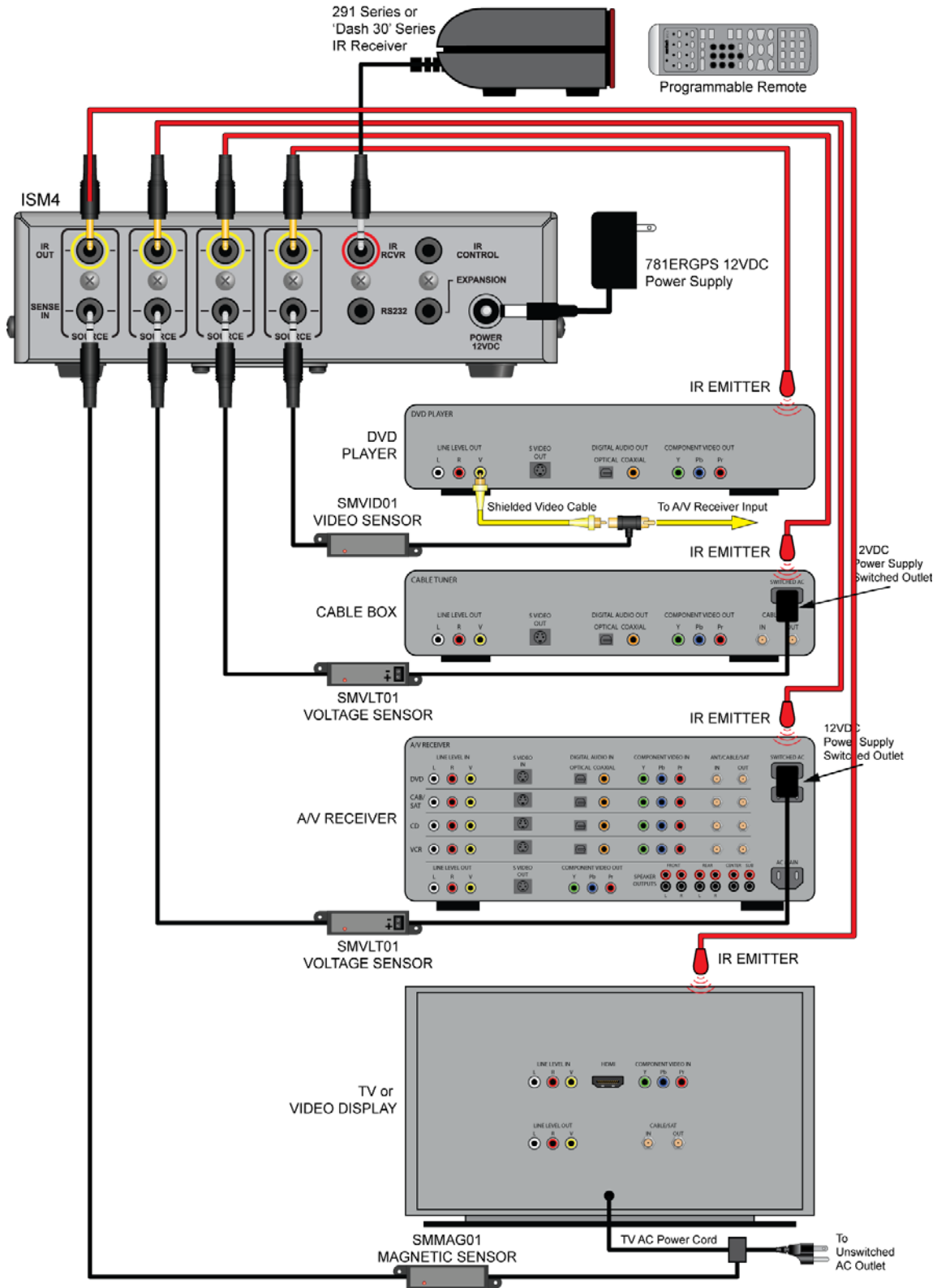


Figure 5 – Typical ISM4 System – TV Triggered Home Theater System/IR Receiver Input

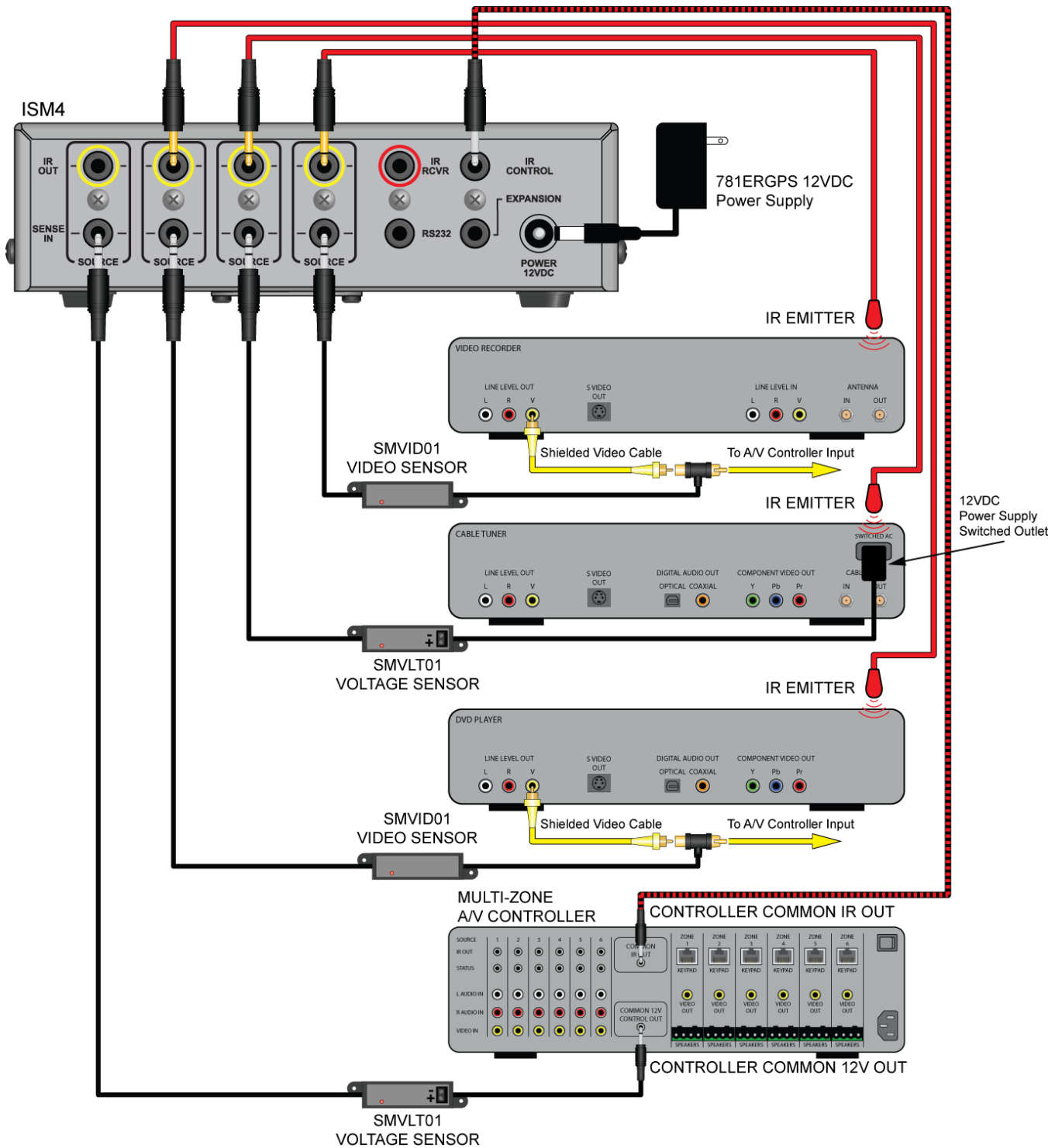


Figure 6 – Typical ISM4 System – Multi-Zone Controller Triggered System/IR Control Input

SYSTEM APPLICATIONS

The ISM4 is a versatile device with endless possible applications. For the purpose of this manual, two basic applications will be described. One is a typical Home Theater application with the ISM4 managing system sync for an A/V Receiver and three source components. The other is a multi-zone application integrating the ISM4 with a multi-zone controller that does not provide intelligent source power management to keep the sources in sync with whole-house system status.

HOME THEATER SYSTEM (Figure 4)

In this configuration, all system components can either be controlled directly with a programmed system remote or exclusively through an IR Receiver connected to the ISM4. In this configuration the A/V Receiver will be turned ON/OFF with the remote (or receiver front panel power button). When the receiver turns ON, the switched AC Outlet on the rear panel will also turn ON, energizing the connected 12V Power Supply. The SMVLT01 Voltage Sensor will detect the change of state, (in this case from OFF to ON) and show a control voltage to the Source 1 "Sense In" on the ISM4. (ISM4 System Status is always referenced to the device sensed by the Source 1 "Sense In"). The first task that the ISM4 will take in response to the Off-to-On transition is to execute the Power ON Macro associated with the Source 1 "Sense In" input. Recall that in executing this macro (launched by a Source 1 "Sense In" trigger) the IR content of the first Command Structure will be bypassed. Refer to the **Sense In** section for further information. The ISM4 will then 'look' at the other Source Sense Inputs and if they are OFF (no sensor control voltage), the ISM4 will output the Power ON Macros associated with each source to turn them ON. THE SYSTEM POWER ON COMMAND IN THE REMOTE SHOULD ONLY CONTROL THE A/V RECEIVER. The ISM4 will control the other devices for turn ON and sync. Additionally, each Source Power ON Macro can be programmed for up to five IR commands (and associated delays). If the sources are to be set to particular settings at turn on, these commands will be issued by the ISM4, and NOT the system remote. If at any time that the System Reference Device (A/V Receiver) is ON, any of the other sources turn off, for any reason, the ISM4 will sense the variation from system sync (source OFF vs system ON), and the ISM4 will automatically issue the Power ON Macro for the device that is out of sync.

IR commands from the remote can be passed through the ISM4 via the IR Receiver to the emitters, allowing the system components to be hidden in a cabinet or closet, as long as the IR Receiver is positioned in 'line-of-sight' to the system remote. The system components can also be controlled directly from the remote, but no power commands should be issued from the remote other than for the A/V Receiver.

Turning the system OFF is the opposite process. When the A/V Receiver is turned OFF with the system remote (or receiver front panel button), the switched AC outlet on the rear panel will turn OFF, de-energizing the 12V power supply. The SMVLT01 Voltage Sensor will detect the change of state, (ON to OFF), and cut the control voltage to the Source 1 "Sense In". The first task that the ISM4 will take in response to the On-to-Off transition is to execute the Power Off Macro associated with the Source 1 "Sense In" input. Recall that in executing this macro (launched by a Source 1 "Sense In" trigger) the IR content of the first Command Structure will be bypassed. Refer to the **Sense In** section for further information. The ISM4 will then 'look' at the other Source Sense Inputs and if they are ON, (sensor control voltage) the ISM4 will output the Power OFF Macros associated with each source to turn them OFF. THE SYSTEM POWER OFF COMMAND IN THE REMOTE SHOULD ONLY CONTROL THE A/V RECEIVER. The ISM4 will control the other devices.

Other Applications

Using the same basic scheme described above, there are many options as to what device will be the System Reference Device. In some cases it will be most intuitive to have a TV, Video Monitor or projector be the System Reference Device. (See **Figure 5** in this manual and the **ISM4 Quick Start Guide** for configuration and programming instructions) Any time the TV is turned ON, by incorporating a SMVID01 Video Sensor on a TV Video Output, the ISM4 will execute ON Macros to turn ON an A/V Receiver, DVD Player, Cable Box and Satellite Receiver, for example. Another possibility would be to have a Video Game trigger the system. By making the Video Game the System Reference Device, any time the Video Game is turned ON, the ISM4 will activate and sync all appropriate devices for extreme gaming. The possibilities are endless. When incorporating an ISM4 into a system, ask the question: "What device or appliance do I want to use to trigger other devices or appliances?"

MULTI-ZONE A/V SYSTEM (Figure 6)

The multi-zone configuration provides automatic power management (system sync) when used with a multi-zone system controller that does not feature intelligent source power management. Some multi-zone controllers come equipped with proper, reliable system sync management capabilities (Xantech MRC44/88). Some provide methods that guess at system status, that is, they will output ON/OFF commands in conjunction with the controller status, but do not really know if the source components are ON or OFF, while others provide no method of power management at all. ISM4 is the perfect complement to these last two types of controllers.

In this configuration, system commands are initiated in the remote zones via keypads and/or IR Receivers. Typically, when the first zone on a multi-zone controller is activated, the controller will turn ON and in most cases, also turn on a Common 12V Control Output. With this Control Out connected to a SMVLT01 Voltage Sensor, the SMVLT01 Voltage Sensor will detect the change of state, (in this case from OFF to ON) and show a control voltage to the Source 1 "Sense In" on the ISM4. (ISM4 System Status is always referenced to the device sensed by the Source 1 "Sense In".) The ISM4 will then 'look' at the other Source Sense Inputs and if they are OFF (no sensor control voltage), the ISM4 will output the Power ON Macros associated with each source to turn them ON. **KEYPADS AND ZONE REMOTES SHOULD BE PROGRAMMED ONLY TO TURN THE LOCAL ZONE ON AND SHOULD NOT INCLUDE SOURCE POWER COMMANDS IN "ON MACROS"**. The ISM4 will control the other devices for turn ON. Additionally, each Source Power ON Macro can be programmed for up to five IR commands (and associated delays) so if the sources are to be set to particular settings at turn on these commands will be issued by the ISM4, NOT the multi-zone controller. If at any time that the System Reference Device (multi-zone controller) is ON, any of the other sources turn off, for any reason, the ISM4 will sense the variation from system sync (source OFF vs system ON), and the ISM4 will automatically issue the Power ON Macro for the device out of sync.

In a typical multi-zone system, the connected keypads and/or IR Receivers will issue zone/system commands directly to the system controller (Zone ON/OFF, Volume, Source Select, etc). (The ISM4 does not play any part in controlling the multi-zone controller, only the source components.) Some multi-zone systems issue IR commands for source control from the keypads or pass through IR commands from IR Receivers and zone remotes, while others generate IR commands initiated by keypad button presses or 'IR trigger commands'. In any case, the IR commands that are output from the controller must be routed from the Common IR Output on the multi-zone controller and then to the IR Control In on the ISM4. The source IR commands will then pass through the ISM4 to the Source IR Outs. This means the IR emitters for the sources will be connected to the ISM4, NOT the multi-zone controller. This allows use of one IR emitter per source rather than having one from the multi-zone controller and one from the ISM4. System operation will be normal and the IR routing will be 'invisible' to the user. (This makes the ISM4 a perfect ad-on for exiting systems with sync issues.) One important note: The ISM4 IR pass-through is not routed so systems with multiple same brand/same model devices will not have selective control for tuning SAT 1 or SAT 2 unless multiple IR code groups are available.

Turning the system OFF is the opposite process. Typically, when the last zone on the multi-zone controller is turned OFF the Common 12V Control Out will also turn OFF. The SMVLT01 Voltage Sensor will detect the change of state, (ON to OFF), and cut the control voltage to the Source 1 "Sense In". The ISM4 will then 'look' at the other Source Sense Inputs and if they are ON, (sensor control voltage) the ISM4 will output the Power OFF Macros associated with each source to turn them OFF. **KEYPADS AND ZONE REMOTES SHOULD BE PROGRAMMED ONLY TO TURN THE LOCAL ZONE OFF AND SHOULD NOT INCLUDE SOURCE POWER COMMANDS IN OFF MACROS**. The ISM4 will control the other devices.

INSTALLATION

The ISM4 should be installed in the same general location as the system A/V components (A/V Receiver, Multi-Zone Controller, DVD, SAT, etc). Xantech SM Series Sensor Cables are approximately 6 feet in length and Xantech IR Emitter wires are approximately 10 feet in length, so plan the ISM4 location relative to the other equipment accordingly. The ISM4 does not generate any critical amount of heat and does not need any special consideration in terms of ventilation but proper precautions should always be taken to assure the free flow of air through and around system components to avoid damage. The ISM4 can be placed on a shelf in an equipment rack or closet or placed directly on top of a system device. It is suggested however, that the ISM4 not be placed directly on top of a device that generates high levels of heat to protect the ISM4 circuitry and longevity.

CONNECTIONS

ISM4 connections are fairly simple. The most important factor is keeping the wiring consistent by source. That means be sure the device connected to the Source 1 “Sense In” is the same device attached to the Source 1 IR Emitter. Labeling the Sensor and Emitter Wires as Source 1, 2, 3, 4 or by specific brand/device (Denon Receiver, Toshiba DVD, etc) will help in avoiding connection errors and assist in troubleshooting, if necessary. There are many possible connection schemes for ISM4 controlled systems. For the purpose of the following discussions, the systems in Figures 4 and 6 will be used. Also note that Xantech manufactures a full line of Sensor Modules including: Audio (SMAUD01), Video (SMVID01), Magnetic/Current (SMMAG01), LED/Light (SMLIT01), Contact Closure (SMCC01) and Voltage (SMVLT01) for additional application flexibility of the ISM4.

HOME THEATER SYSTEM (Figure 4)

ISM4

1. Plug the included **12VDC Power Supply 2.1mm coaxial plug** into the **Power Jack** on the **ISM4 Rear Panel**.
2. Plug the **Power Supply** into an *unswitched AC Outlet*.

Source 1 (A/V Receiver)

1. Cut the plug off the end of an *unregulated 12VDC Power Supply*. (An unregulated power supply's decay time, 12V to 0V, is faster than a regulated supply, netting faster system response.) Strip approximately 1/4" off the jacket and twist the strands so that there are no loose ends that can cause shorts.
2. Connect the **stripped ends** to the appropriate **terminals** on the **SMVLT01 Sensor**. Maintain proper polarity, typically white stripe (+12V) to the '+' terminal, black wire (GND) to the '-' terminal.
3. Plug the **power supply** into a *switched AC outlet* on the **A/V Receiver**.
4. Plug the **SMVLT01 3.5mm mini plug** into the **ISM4 Source 1 “Sense In” Jack**.
5. Turn the **A/V Receiver ON**. The **SMVLT01 Status LED** should illuminate **red**. (The Source 1 Status LED on the ISM4 Front Panel should also illuminate solid green. For now, disregard any other front panel LED activity.)
6. Turn the **A/V Receiver OFF**. The **SMVLT01 Status LED** should turn **off**. If it does not turn off, adjust the **sensitivity** to the point where the **Status LED** turns **off**. (The Source 1 Status LED on the ISM4 Front Panel should also turn off. For now, disregard any other front panel LED activity.)
7. Remove the **protective backing** from an **IR Emitter head**. Carefully attach the emitter over the **IR eye** of the **A/V Receiver**. If the eye is not obvious, shine a small flashlight into the faceplate to locate it or refer to the product manual.
8. Carefully pull the **emitter wire** to the back of the A/V Receiver and over to where the **ISM4** is located. Be careful not to pinch the wire between components.
9. Plug the **Emitter 3.5mm mini plug** into the **ISM4 Source 1 “IR Out “Jack**.
10. Label the sensor and emitter wires for reference.

Source 2 (DVD Player)

1. Using a shielded **male to male RCA-RCA video cable** (Composite Video Cable) with gold ends, connect the **Composite Video Output** of the **DVD Player** to the **SMVID01 RCA sensor head**.

2. Either plug the **sensor head** directly into the **A/V Receiver DVD Composite Video Input** or connect a shielded **female to male RCA-RCA cable** with gold ends to the **sensor head** and then to the **AV Receiver DVD Composite Video Input**.
3. Plug the **SMVID01 3.5mm mini plug** into the **ISM4 Source 2 "Sense In" Jack**.
4. Turn the **DVD Player ON**. The **SMVID01 Status LED** should illuminate **red**. (The Source 2 Status LED on the ISM4 Front Panel should also illuminate green. For now, disregard any other front panel LED activity.)
5. Turn the **DVD Player OFF**. The **SMVID01 Status LED** should turn **off**. If it does not turn off, adjust the **sensitivity** to the point where the **Status LED** turns **off**. (The Source 2 Status LED on the ISM4 Front Panel should also turn off. For now, disregard any other front panel LED activity.)
NOTE: Some devices have a constant signal output on the composite video output jack (many cable boxes and other devices) and will not be compatible with video sensing. If adjusting the sensitivity on the SMVID01 with the DVD player (or other device) does not turn the Status LED OFF, another sensing method must be used, such as a switched outlet on a cable box as shown in **Figure 4**.
6. Remove the **protective backing** from an **IR Emitter head**. Carefully attach the emitter over the **IR eye** of the **DVD Player**. If the eye is not obvious, shine a small flashlight into the faceplate to locate it or refer to the product manual.
7. Carefully pull the **emitter wire** to the back of the DVD Player and over to where the **ISM4** is located. Be careful not to pinch the wire between components or block the disc drawer.
8. Plug the **Emitter 3.5mm mini plug** into the **ISM4 Source 2 "IR Out" Jack**.
9. Label the sensor and emitter wires for reference.

Source 3 (Cable Box)

Follow the instructions for **Source 1 (A/V Receiver)**, for **voltage sensing**. The switched outlet on most cable boxes must be configured in the **Cable Box Setup Menu**. Be sure the **AC Convenience Outlet** is set to: **Switched**.

Source 4 (Video Recorder)

Follow the instructions for **Source 2 (DVD Player)**, for **video sensing**.

IR Receiver

1. Plug a Xantech 291 Series or 'Dash 30' Type IR Receiver (IR Receivers with an attached stereo 3.5mm mini plug cable), into the IR Receiver Jack on the ISM4 Rear Panel. Position the IR Receiver as appropriate for 'line-of-sight' to the where the system remote will typically be used. This will allow IR control of the ISM4 and pass through of IR commands from the system remote to the source devices.

MULTI-ZONE SYSTEM (Figure 6)

ISM4

1. Plug the included **12VDC Power Supply 2.1mm coaxial plug** into the **Power Jack** on the **ISM4 Rear Panel**.
2. Plug the **Power Supply** into an *unswitched AC Outlet*.

Source 1 (Multi-Zone Controller)

1. Using a **Xantech 5-Foot Mini Plug Cable**, (3.5mm mini plug to two stripped/tinned leads, Xantech Part No 06015900), plug the **mini plug** end into the **Common 12V Control Out** on the **multi-zone controller**.
2. Connect the **stripped/tinned ends** to the appropriate **terminals** on the **SMVLT01 Sensor**. Maintain proper polarity, typically white stripe (+12V) to the '+' terminal, black wire (GND) to the '-' terminal. (See manufacturer's product manual to verify the pin-out of the Common 12V Out Jack.)
3. Plug the **SMVLT01 3.5mm mini plug** into the **ISM4 Source 1 "Sense In" Jack**.
4. Turn a **Zone** on the **multi-zone controller ON**. The **SMVLT01 Status LED** should illuminate **red**. (The Source 1 Status LED on the ISM4 Front Panel should also illuminate solid green. For now, disregard any other front panel LED activity.)
5. Turn the **multi-zone controller OFF**. The **SMVLT01 Status LED** should turn **off**. If it does not turn off, adjust the **sensitivity** to the point where the **Status LED** turns **off**. (The Source 1 Status LED on the ISM4 Front Panel should also turn off. For now, disregard any other front panel LED activity.)

6. Using a **Xantech 10-Foot Mono Cable** (Xantech Part No 06017450) connect the **Common “IR Out “** on the multi-zone controller to the **IR Control Jack** on the **ISM4 Rear Panel**. This will allow IR control of the ISM4 and pass through of IR commands from the multi-zone controller to the source devices.
7. There is no required emitter connection to Source 1 in this application.
8. Label the Sensor and Common IR wires for reference.

Source 2 (DVD Player)

10. Using a shielded **male to male RCA-RCA video cable** (Composite Video Cable) with gold ends, connect the **Composite Video Output** of the **DVD Player** to the **SMVID01 RCA sensor head**.
11. Either plug the **sensor head** directly into the **multi-zone controller DVD Composite Video Input** or connect a shielded **female to male RCA-RCA cable** with gold ends to the **sensor head** and then to the **multi-zone controller DVD Composite Video Input**.
12. Plug the **SMVID01 3.5mm mini plug** into the **ISM4 Source 2 “Sense In” Jack**.
13. Turn the **DVD Player ON**. The **SMVID01 Status LED** should illuminate **red**. (The Source 2 Status LED on the ISM4 Front Panel should also illuminate solid green. For now, disregard any other front panel LED activity.)
14. Turn the **DVD Player OFF**. The **SMVID01 Status LED** should turn **off**. If it does not turn off, adjust the **sensitivity** to the point where the **Status LED** turns **off**. (The Source 2 Status LED on the ISM4 Front Panel should also turn off. For now, disregard any other front panel LED activity.)
NOTE: Some devices have a constant signal output on the composite video output jack (many cable boxes and other devices) and are not compatible with video sensing. If adjusting the sensitivity on the SMVID01 with the DVD player (or other device) OFF does not turn the Status LED OFF, another sensing method must be used, such as a switched outlet on a cable box as shown in **Figure 6**.
15. Remove the **protective backing** from an **IR Emitter head**. Carefully attach the emitter over the **IR eye** of the **DVD Player**. If the eye is not obvious, shine a small flashlight into the faceplate to locate it or refer to the product manual.
16. Carefully pull the **emitter wire** to the back of the DVD Player and over to where the **ISM4** is located. Be careful not to pinch the wire between components or block the disc drawer.
17. Plug the **Emitter 3.5mm mini plug** into the **ISM4 Source 2 “IR Out “Jack**.
18. Label the sensor and emitter wires for reference.

Source 3 (Cable Box)

Follow the instructions for **Source 1 (A/V Receiver)**, for **voltage sensing**. The **switched outlet** on most cable boxes must be configured in the **Cable Box Setup Menu**. Be sure the **AC Convenience Outlet** is set to: **Switched**.

Source 4 (Video Recorder)

Follow the instructions for **Source 2 (DVD Player)**, for **video sensing**.

OTHER CONNECTIONS

RS232

This Port connects to the RS232 Output on a system control device such as an A/V Receiver, Multi-Zone Controller, Touch Panel, etc. RS232 Commands input on this port can trigger ISM4 IR output for Source 1 Power (discrete ON/OFF, toggle ON/OFF), Query Source Power State (all sources) and System Info. This Port is bi-directional and will automatically send ISM4 System Status Info when any Source state change has occurred (provided that the Automatic Source Power State Notification feature is enabled) or when queried by the RS232 control device. See Section: **RS232** for additional information.

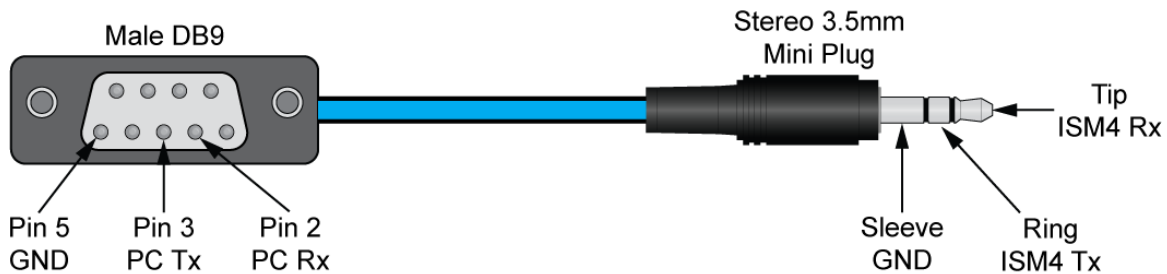


Figure 7 ISM4 RS232 Pinout

1. Using a **stereo 3.5mm mini plug**, connect the **ISM4 RS232 Port** to an appropriate **RS232 Port** on the system **control device** to be used for **RS232 control**. Adapt the stereo mini-plug cable to the control device port as appropriate (DB-9, RJ45, etc.) Xantech manufactures a Male DB9 to 3.5mm Mini Plug Cable (Xantech Part No 05913780) configured as shown in **Figure 7**. Please refer to the control device documentation for the pinout of that device's RS232 Port.

EXPANSION

This jack connects to the **Source 1 "Sense In"** on an **Expansion ISM4** for system sync of three additional devices. When the **Source 1 "Sense In"** on the **Primary ISM4** senses an **ON state** (Sensor Control Voltage), this jack outputs **12VDC** to the **Source 1 "Sense In"** on the **Expansion ISM4** to indicate the **System ON state**. The **Source 2-4 devices** on the **Expansion ISM4** will then sync to the system as programmed (turn ON). When the **Source 1 "Sense In"** on the **Primary ISM4** senses an **OFF state** (No Sensor Control Voltage), this jack outputs **0VDC** to the **Source 1 "Sense In"** on the **Expansion ISM4** to indicate the **System OFF state**. The **Source 2-4 devices** on the **Secondary ISM4** will then sync to the system as programmed (turn OFF). Additional ISM4s can be added as needed increasing the number of 'managed' devices by three for each additional ISM4.

NOTE: For Expansion, each ISM4 must be programmed individually for the specific devices connected to each ISM4. See Section: **Programming/Expansion** for additional Information.

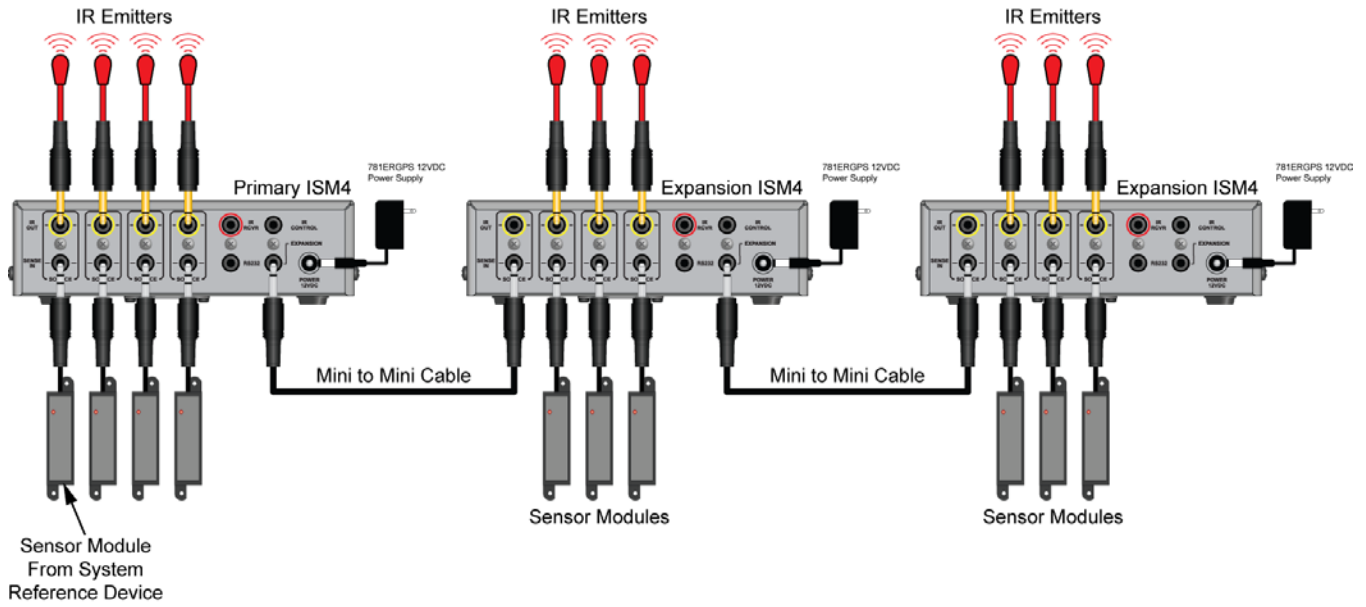


Figure 8 ISM4 Expansion Connections

1. Using a **1-Foot Mono Cable** (Xantech Part No 6017400), connect the **Expansion Jack** on the **Primary ISM4** to the **Source 1 "Sense In"** on the **First Expansion ISM4**.
2. If using **additional ISM4s**, repeat **Step 1** for each additional ISM4 as shown in **Figure 8**.
3. Connect the included **Power Supplies**, one to each ISM4.
4. Connect the **Sensors** and **Emitters** as described the Sections: **Connections/Home Theater System** or **Connections/Multi-Zone System**.

NOTE 1: The **Source 1 "Sense In"** on the **ISM4 Expansion units** is used for **System Status** as referenced to the **System Reference Device**. There is no required **IR Emitter** connection to the **Source 1 IR Outs** on the **ISM4 Expansion units**.

NOTE 2: If using the Expanded application with a **multi-zone controller**, there would be **no** required **IR Emitter** connection to the **Primary ISM4 Source 1 "IR Out"** as shown in **Figure 8**.

PROGRAMMING

Programming the ISM4 is similar to manually programming a learning remote. All IR commands are programmed (learned) directly to the ISM4 using the original equipment remotes. There is no PC or programming software requirement. If the ISM4 is going to be set up to automatically 'manage' system devices (Sources 2-4) based solely upon the status (ON/OFF) of the System Reference Device (Source 1 - A/V Receiver, Multi-Zone Controller, etc), with the original remotes in-hand, the first step is to plan the Source Macros.

One of the ISM4 control options has the ISM4 react to Xantech RC68 IR Commands for Discrete Power ON/OFF or Toggle Power ON/OFF control of Source 1. The 'discrete' option allows programming discrete System ON/OFF 'Trigger' Commands to a system remote or control device when the System Reference Device does not have discrete ON/OFF Commands. This will provide separate System ON/OFF buttons and help the user avoid inadvertently turning the system ON/OFF. The 'toggle' option allows utilizing a single button for system ON/OFF from a system remote or control device. If utilizing this feature, a Xantech RC68X will also be required. (Older models: RC68 and RC68+ are also compatible.) See Section: **Programming RC68 ON/OFF Trigger Commands** for additional information.

SOURCE ON/OFF MACROS

The ISM4 allows programming one ON and one OFF Macro per Source. Each of these Macros can contain up to five sets of IR Commands and Delays called Command Structures. Different Front Panel LED prompts indicate which Macro (ON/OFF) for which Source (1-4) and which step or 'Command Structure' (1-5) is being programmed.

COMMAND STRUCTURES

A Command Structure is the combination of an IR command and an associated Delay within a given Source ON or OFF Macro. Each ON or OFF Macro can contain up to five Command Structures. A Command Structure has an associated Delay even if the delay value is 0 seconds. All five Command Structures do not need to be programmed within an ON or OFF Macro. If only the ON or OFF command is to be issued with no further setup (input, play, etc) to the controlled device(s) then only the ON or OFF Command need be programmed.

SOURCES 1- 4		
Command Structure	Source ON Macro	Source OFF Macro
1	IR	IR
	Delay	Delay
2	IR	IR
	Delay	Delay
3	IR	IR
	Delay	Delay
4	IR	IR
	Delay	Delay
5	IR	IR
	Delay	Delay

Table 1 Command Structures

NAVIGATING AND EDITING MACROS

The six Front Panel Buttons each have multiple functions, depending upon the ISM4 Mode. There is a detailed explanation of those functions within the different modes in the **Appendix**. An understanding of the button presses will help make the programming process easier. For the actual programming instructions, proceed to Section: **Programming Macros**, immediately following.

PROGRAMMING MACROS

The first step in programming the ISM4 is to fill out the Macro Programming Table. This will help keep track of what device is being programmed for which command with how much delay in which Command Structure within the Source ON or OFF Macro being programmed. Fill out the Table as appropriate for the ISM4 being programmed. It might be advantageous to keep a backup copy of of the table for later use.

MACRO PROGRAMMING TABLE

MACRO PROGRAMMING TABLE								
Command Structure	Source 1		Source 2		Source 3		Source 4	
Brand 1								
Device 1								
	ON	OFF	ON	OFF	ON	OFF	ON	OFF
IR Command								
Delay (Sec)								
Brand 2								
Device 2								
	ON	OFF	ON	OFF	ON	OFF	ON	OFF
IR Command								
Delay (Sec)								
Brand 3								
Device 3								
	ON	OFF	ON	OFF	ON	OFF	ON	OFF
Command								
Delay (Sec)								
Brand 4								
Device 4								
	ON	OFF	ON	OFF	ON	OFF	ON	OFF
IR Command								
Delay (Sec)								
Brand 5								
Device 5								
	ON	OFF	ON	OFF	ON	OFF	ON	OFF
IR Command								
Delay (Sec)								

With the ISM4 powered up and with the IR Emitters attached to the devices to be controlled, program the ISM4 as follows:

NOTE: Unless instructed to press a button for a specific duration a button press should be at most one full second.

IMPORTANT NOTE: If programming the ISM4 so the System Reference Device (Source 1) will be turned ON and OFF with its native remote or other system controller, the programmer must ensure that the Power command (if present) be placed in Command Structure number 1. This applies to both the ON and OFF macros. This requirement is imposed on Source 1 ONLY. Refer to the “Sense In” section for further details.

If there are other ‘setup’ commands to be executed as part of the Source 1 ON Macro, (Input, Surround Mode, Tuner Preset, etc), simply program a delay long enough to allow Source 1 to power up and respond to additional IR commands. (**Step 13** below). Recall that the Delay will be executed regardless of whether or not a Power Command is present in Command Structure 1.

If any of Sources 2-4 will have ‘setup’ commands included in their ON Macros, be sure to program a delay in the Source ON Macro, Command Structure 1 that is long enough to allow those Sources to power up and be ready to respond to additional IR commands.

The following sections mention the ISM4’s time dependent push button function blink patterns. For a detailed discussion refer to section “**Source 1-4 LED’s**”. These blink patterns were added to transfer the time keeping burden away from the programmer and onto the ISM4.

Learn IR

1. Press the **Sequence Button** for 2 seconds (Indicated by the first blink of the Active Source LED) to enter **Edit Mode**. The ISM4 will default to the **Source 1 ON Macro**. (Source 1 and Program LED’s sold green.)
2. Press the **Sequence Button** to enter **IR Learn Mode** for **Source 1 ON Macro Command Structure 1**. The **Source 1 LED** will flash for about 5 seconds. This is the amount of time allowed to teach an **IR Command**.
3. Position the **IR Remote** for the System Reference Device (Source 1) directly in front of the **IR Learn Window** on the ISM4 (within an inch) and press and hold the **ON** or **Power Button** on the remote until the **Program LED** flashes **green** three times. If the **Program LED** flashes **red** three times, proceed to **Step 9**.
4. Press the **Test Button** and confirm the function of the learned command on **Source 1**.
5. If **Source 1** responded properly to the learned command, press **Sequence** again to save the command. The **Program LED** will flash once. The ISM4 will automatically return to **EDIT Mode** upon save. To return to **Edit Mode** without saving, press the **PREV Button**. Proceed to **Step 11 or 13**, as appropriate.
6. If **Source 1** *did not* respond properly to the learned command, press **Delete**. The ISM4 will automatically go into **IR Learn Mode** for the current **Command Structure**. (Source 1 ON Macro; Command Structure 1)
7. Repeat **Steps 3-6** as necessary until the command is learned, tested, confirmed and saved.
8. To add a **Delay** to **Command Structure 1**, proceed to **Step 13**.

IR Learn Error

9. If the **Program LED** flashed **red** three times during IR Learn, that indicates a learn error. Press **Delete** to remove the bad command from memory.
10. Repeat **Steps 2-6** as necessary until the command is learned, tested, confirmed and saved.

No Delay – with additional Command Structures in the Macro

11. If there is **no delay** required for **Command Structure 1**, and there is at least one more **Command Structure** in the **Macro**, press “**Next**” for one second. The **Source 1 LED** will flash **twice** indicating the ISM4 is ready to **Learn** the **IR Command** for **Command Structure 2**. If the ISM4 is pointing to Command Structure 3, the Source 1 Led will blink 3 times. It will blink 4 times if pointing to Command Structure number 4 and 5 times if pointing to Command Structure number 5.
12. Repeat **Steps 2-9** as necessary until the IR Command for **Command Structure 2** is learned, tested, confirmed and saved.

Delay – with additional Command Structures in the Macro

13. To **add a delay** after the **IR Command** in **Command Structure 1**, after **Step 5**, press the **Delay Button**. The ISM4 will respond by entering **DELAY Learn Mode** and the **Program LED** will flash **once**.
14. Press the **Next Button** *once for each second of Delay* to be added to the **Command Structure**. Press the **Prev Button** *once for each second of Delay* to be **subtracted**.
- NOTE:** The first press of the Next Button will add one second of delay. Each additional press will add one second up to 60 seconds after which the timer will reset to 0 seconds. The first press of the Prev Button will add 60 seconds of delay. Each additional press will subtract one second down to 0 seconds after which the timer will reset to 60 seconds.

No Delay – no additional Command Structures in the Macro

15. If there are **no additional Command Structures** in the **Source 1 ON Macro**, press "**Next**" for 2 seconds (Indicated by the first blink of the Active Source LED). The ISM4 will shift to the **Source 1 OFF Macro, Command Structure 1**. (Source LED solid green, Program LED solid red.)
- NOTE:** A 2 second press of the **Prev Button** (Indicated by the first blink of the Active Source LED) will shift programming to the previous Macro. (i.e. a 2 second press of the Prev Button while in Source 1 ON Edit Mode, will shift Edit Mode to the Source 4 OFF Macro. (Source 4 LED solid green, Program LED orange.)

Test Macro

16. When all **Command Structures** within a **Source ON** or **OFF Macro** have been programmed, tested and saved, the complete **Macro** can be tested by pressing the **Test Button**.
- NOTE 1:** If the IR Commands and Delays within the Command Structures were not properly saved, the Macro cannot be tested and the Program LED will flash red to indicate error.
- NOTE 2:** To Test a Macro starting from Normal Operation Mode, Press Sequence for 2 seconds (Indicated by the first blink of the Active Source LED) to enter Edit Mode, (Source 1 and Program LED's green), Navigate to the Macro to be tested (2 second press of Prev or Next) and then press the **Test Button**.

Program Remaining Macros

17. Navigate to the next **Source ON** or **OFF Macro** to be programmed. From the **Source 1 ON Macro**, press the **Next Button** for 2 seconds (Indicated by the first blink of the Active Source LED). The ISM4 will shift to the **Source 1 OFF Macro; Command Structure 1**. (Source LED solid green, Program LED solid orange.)
- NOTE:** A 2 second press of the **Prev Button** (Indicated by the first blink of the Active Source LED) will shift programming to the previous Macro. (i.e. a 2 second press of the Prev Button while in Source 1 ON Edit Mode, will shift Edit Mode to the Source 4 OFF Macro. (Source 4 LED solid green, Program LED red.)
18. Repeat **Steps 2-17** above until all **Source ON** and **OFF Macros** have been programmed, tested and saved. It is vitally important to program *both* the **Source ON** and **OFF Macros**. The ISM4 will not function properly if both sets of Macros have not been programmed.

Exit Edit Mode

19. To exit **Edit Mode**, at any time during **Edit Mode**, press the **Prev Button** for 10 seconds (Indicated by the third blink of the Active Source LED). The ISM4 will return to **Normal Operating Mode**.

Test ISM4 (All Macros)

- NOTE:** All system devices and components must be properly setup and connected to test ISM4 Macro Programming. Be sure all Sensors are connected to the appropriate device and Source Sense Inputs on the ISM4, and be sure all IR Emitters are connected to the appropriate Source "IR Out" on the ISM4 and attached to the correct device over the IR eye for that device.
20. With **all Sources OFF**, turn the **System Reference Device (Source 1)** ON. All **Sources** should turn ON and any additional setup programming (source select, play, etc) should execute as programmed. If any functions were 'missed', test the individual **ON Macro** for that **Source**. Re-learn **IR Commands** and adjust **delays** as necessary until the system powers up correctly.
21. Repeat **Step 20** for System OFF. (Turn the **System Reference Device, Source 1, OFF**).

PROGRAMMING RC68 ON/OFF TRIGGER COMMANDS

As noted at the beginning of the Programming Section, one of the ISM4 control options has the ISM4 react to Xantech RC68 IR Commands for Discrete Power ON/OFF or Toggle Power ON/OFF control of Source 1. When using the RC68 Commands, when the ON Button on the system remote is pressed, it will issue the RC68 ON Command. The ISM4 will 'see' the RC68 ON Command and output the native Source 1 device Power or ON command via the Source 1 IR Emitter, (if Source 1 is OFF). In this application, the Power or ON Command for the System Reference Device (Source 1) was pre-programmed into the ISM4. (The same programming and functionality would then also be true for programming the RC68 OFF Command. RC68 Toggle Power is programmed in a similar manner.) To Program RC68 ON/OFF Trigger Commands:

RC68 Discrete ON/OFF Trigger Command Programming

Program

1. Program the **ISM4 Source 1 ON Macro** as described in the **Programming Macros Section**, programming the **IR Command** from the **native remote** for the **System Reference Device, (Source 1) Power or ON Command** to the **Source 1 ON Macro, Command Structure 1**. IF THE POWER OR ON COMMAND FOR SOURCE 1 IS NOT PROGRAMMED TO THIS LOCATION, THE ISM4 WILL NOT FUNCTION PROPERLY.
2. Program the **IR Command** from the **native remote** for the **System Reference Device, (Source 1) Power or OFF Command** to the **Source 1 OFF Macro, Command Structure 1**. IF THE POWER OR OFF COMMAND FOR SOURCE 1 IS NOT PROGRAMMED TO THIS LOCATION, THE ISM4 WILL NOT FUNCTION PROPERLY.
3. Set the **RC68 Remote** to **Code Group 10**.
4. Teach the **RC68 Command** from **Button 00** to the **System Remote Button** that will be used to turn the system ON.
5. Teach the **RC68 Command** from **Button 40** to the **System Remote Button** that will be used to turn the system OFF.

Test ON

6. With all sources, sensors and emitters connected to the ISM4, and with **all sources turned OFF**, test the system by pointing the **System Remote** toward the **ISM4** or connected **IR Receiver** and press the **button** with the **RC68 ON Command**. The **System Reference Device (Source 1)** and **Sources 2-4** should all turn ON.

Test OFF

7. With **all sources turned ON**, test the system by pointing the **System Remote** toward the **ISM4** or connected **IR Receiver** and press the button with the **RC68 OFF Command**. The **System Reference Device (Source 1)** and **Sources 2-4** should all turn OFF.
8. If any functions were 'missed', test the individual **ON** or **OFF Macro** for that **Source**. Re-learn **IR Commands** and adjust **delays** as necessary until the system powers up correctly.

RC68 Toggle ON/OFF Trigger Command Programming

Program

1. Program the **ISM4 Source 1 ON Macro** as described in the **Programming Macros Section**, programming the **IR Command** from the **native remote** for the **System Reference Device, (Source 1) ON Command** to the **Source 1 ON Macro, Command Structure 1**. IF THE ON COMMAND FOR SOURCE 1 IS NOT PROGRAMMED TO THIS LOCATION, THE ISM4 WILL NOT FUNCTION PROPERLY.
2. Program the **IR Command** from the **native remote** for the **System Reference Device, (Source 1) OFF Command** to the **Source 1 OFF Macro, Command Structure 1**. IF THE OFF COMMAND FOR SOURCE 1 IS NOT PROGRAMMED TO THIS LOCATION, THE ISM4 WILL NOT FUNCTION PROPERLY.
3. Set the **RC68 Remote** to **Code Group 10 (One, Zero)**.
4. Teach the **RC68 Command** from **Button 80** to the **System Remote Button** that will be used to turn the system ON/OFF.

Test ON

5. With all sources, sensors and emitters connected to the ISM4, and with all sources turned OFF, test the system by pointing the **System Remote** toward the **ISM4** or connected **IR Receiver** and press the **button**

with the **RC68 Toggle Command**. The **System Reference Device (Source 1)** and **Sources 2-4** should all turn ON.

Test OFF

6. With all sources turned ON, test the system by pointing the **System Remote** toward the **ISM4** or connected **IR Receiver** and press the button with the **RC68 Toggle Command**. The **System Reference Device (Source 1)** and **Sources 2-4** should all turn OFF.
7. If any functions were 'missed', test the individual **ON** or **OFF Macro** for that **Source**. Re-learn **IR Commands** and adjust **delays** as necessary until the system powers up correctly.

RS232 CONTROL AND PROGRAMMING

The **ISM4** can be controlled via **RS232** to allow power management of the devices controlled by the ISM4 from a PC or appropriately capable system controller. It is important to note that the RS232 capability only allows for **Discrete ON/OFF**, **Toggle ON/OFF** as well as **Status** and **System Information**. The **RS232 Discrete ON/OFF** and **Toggle Commands** allow turning the **System Reference Device (Source 1) ON/OFF**. IT DOES NOT ALLOW RS232 CONTROL OF ANY OTHER SOURCES OR FUNCTIONS.

The **Status** feature provides **queried** or **automatic feedback** of **Source ON/OFF Status**. Queried feedback will provide **ON/OFF Status** of **Sources 1-4** in the form of **ASCII Text Strings** when asked by a control device. **Automatic Source Power State Notifications** are provided as **ASCII Text Strings** anytime there is a change in **Source ON/OFF Status**. This feature (Auto) can be turned on or off as appropriate for a given application. By default, this feature is disabled.

ISM4 System Information can also be queried for product information such as **Device**, **Hardware** and **Firmware Rev**, should it be relevant in troubleshooting. Xantech Technical Support personnel may request this information in a problematic application.

To respond to RS232 Commands, the ISM4 must be properly connected via the RS232 jack on the Rear Panel as described in Section: **Other Connections/RS232**.

RS232 Com Port Settings

Use the following Table to configure the RS232 output of the device controlling the ISM4:

ISM4 RS232 COM PORT SETTINGS				
Baud Rate	Parity	Data Bits	Stop Bits	Flow Control
9600	None	8	1	None

RS232 Command Strings

The following Table details the allowable **RS232 Command Strings** for control of the ISM4. Note only **Source 1** can be controlled for ON/OFF. **Automatic Source Power State Notification** is an optional feature that will *automatically* output a report any time there is a *change of state* on any **Sense Input**. The function can be enabled/disabled using the Command Strings in the following Table. The actual report messages are detailed in the **ISM4 Queries Table (Return)**.

ISM4 RS232 COMMAND STRINGS			
Name	Command	Return	Remarks
Source 1 Discrete ON	!1PR1+	OK{CR} ERROR{CR}	Turn Source 1 ON
Source 1 Discrete OFF	!1PR0+	OK{CR} ERROR{CR}	Turn Source 1 OFF
Source 1 Toggle Power	!1PT+	OK{CR} ERROR{CR}	Toggle Source 1 Power (If OFF turn ON; If ON turn OFF)
Enable Automatic Source Power State Notification	1ZA1+	OK{CR} ERROR{CR}	Enable Automatic Source Power State Notification
Disable Automatic Source Power State Notification	1ZA0+	OK{CR} ERROR{CR}	Disable Automatic Source Power State Notification

NOTE: Allowable Syntax for the Command Strings includes: (Source 1 Discrete ON used for example)

!1PR1+
!01PR1+
!1PR01+
!01PR01+

ISM4 Queries

The ISM4 supports two layers of **Source Power Notifications**. The first is supported via explicit **RS232 Queries** (via the **Source Power Query** described in the **Queries Table**). The second is launched automatically by the

system upon detection of a change of state on any **Source Sense Input**. This feature can be enabled/disabled via the **Enable/Disable Automatic Source Power Notification Commands** explained in the **ISM4 RS232 Command Strings Table** above.

The **Source Power Notification Data String** contains **Power Status** information for all four **Sources**. The **Notification Data Structure** is *preceded* by the '#' character prefix and *terminated* with the '+' character. The **Notification Data String** is parsed into four fields. Each field holds one **Source Component State Data Structure** (one per Source Component). Each **Source Component Data Structure** holds information that identifies the particular **source** component and its **power state**, as indicated by the definition of {0/1}, a '0' indicates the **OFF** condition. A '1' indicates an **ON** condition.

Example

```
#SS{S#} PR{0/1}  SS{S#} PR{0/1}  SS{S#} PR{0/1}  SS{S#} PR{0/1}+
```

The **SS{S#}** field indicates which **Source** is being reported. All data that follows will pertain to *that Source*. The end of the current field will be flagged by the presence of another **SS{S#}** field (next Source) or the '+' termination character (end of report).

The **PR{0/1}** field indicates the **Power State** of the reported **Source**. That is, it indicates the **Power State** of the **Source** identified by the **SS{S#}** field that immediately precedes it.

The string below is an example of a string that might be sent out by the ISM4:

```
#SS1 PR1 SS2 PR1 SS3 PR0 SS4 PR0+
```

This string indicates the following:

Source 1 Power State = ON

Source 2 Power State = ON

Source 3 Power State = OFF

Source 4 Power State = OFF

The **System Info Query** can be useful in determining the build of a particular ISM4. On occasion, Xantech Technical Personnel may ask for this information should a problematic situation occur.

ISM4 QUERIES				
Name	Query	Return	Example Return	Remarks
Source Power	?{s#}PR+	?{s#}PR{0/1}+	?1PR0+{CR}	Power in Zone 1 is OFF
System Info	?SI+	?SI {Device: IPM4, Device Cde: 000F, Hardware Cde: 0000, Reserved Cde: 0000, Firmware Ver: X.Y.Z}+	?SI Device: IPM4, Device Cde: 000F, Hardware Cde: 0000, Reserved Cde: 0000, Firmware Ver: 1.0.0	NOTE: This is command does not trickle down to the Expansion Port. X = Major Y = Minor Z = Release

NOTE: Allowable Syntax for the Queries includes: (Source 1 Power used for example)

```
?1PR+
```

```
?01PR+
```

RS232 Command String/Query Legend

{CR} = Carriage Return

{s#} = Source Input Number Range 1-4 or 01-04

{0/1} = Either 0 (zero) or 1 (one); 0 = OFF, 1 =ON

CLONING THE ISM4

When necessary, the **Macro Table** (All Source ON and OFF Macros and their contents) can be **cloned** from a programmed ISM4 to another ISM4. The cloning process requires a **Xantech Null Stereo 3.5mm Mini Cable**, (Xantech Part No 06028145). **DO NOT USE A STANDARD STEREO MINI CABLE FOR CLONING.** To clone an ISM4:

1. Using a **Xantech Null Stereo 3.5mm Mini Cable**, (Xantech Part No 06028145), connect the **RS232 Port** on the programmed ISM4 to the RS232 Port on the unprogrammed ISM4.
2. In Normal Operating Mode, press the **Prev Button** on the Primary (programmed) ISM4 unit for longer than 2 seconds. The **Source LED's** will flash fast for a few seconds and stop. Cloning is complete.
3. Install and use as programmed.

OPERATING THE ISM4

Once setup, there is typically no direct interaction with the ISM4. It will automatically respond to system conditions, IR and RS232 Commands.

System ON Mode

When the **System Reference Device (Source 1)** is turned ON, via a power button on the device, an IR remote control, a RS232 Command etc, the ISM4 will detect the change of state (OFF to ON) and automatically enter **System ON Mode**. In this mode, the first task that the ISM4 will take in response to the Off-to-On transition is to execute the Power ON Macro associated with the Source 1 “Sense In” input. Recall that in executing this macro (launched by a Source 1 “Sense In” trigger ONLY) the IR content of the first Command Structure will be bypassed. Refer to the **Sense In** section for further information. Next, the ISM4 will ‘look’ at the **Source 2-4 Sense Inputs**, and if any one shows an OFF condition, the ISM4 will output the **ON Macro** associated with *that Source*.

The **Source LED’s** will flash, by **Source**, when the **ON Macros** are being sent. The **Front Panel Source 1-4 LED’s** will illuminate solid green to indicate a sensed ON condition for *each Source*. If for some reason a particular Source does not respond to an ON Macro, the ISM4 will resend that macro. The ISM4 will resend an ON Macro up to four times. During the resends, the **ISM4 Program LED** will flash **red** indicating that an error has occurred in executing an **ON Macro** and that the Source for which the macro is being resent is out of sync with the system.

The ISM4 will continually scan the **Sense Inputs**. As long as **Source 1** is ON (System ON Mode), if any of **Sources 2-4** turns OFF, for any reason, the ISM4 will automatically output the **ON Macro** for *that Source*, keeping all Sources synced to the **System ON Mode**.

System OFF Mode

When the **System Reference Device (Source 1)** is turned OFF, via a power button on the device, an IR remote control, a RS232 Command etc, the ISM4 will detect the change of state (ON to OFF) and automatically enter **System OFF Mode**. In this mode, the first task that the ISM4 will take in response to the On-to-Off transition is to execute the Power OFF Macro associated with the Source 1 “Sense In” input. Recall that in executing this macro (launched by a Source 1 “Sense In” trigger ONLY) the IR content of the first Command Structure will be bypassed. Refer to the **Sense In** section for further information. Next, the ISM4 will ‘look’ at the **Source 2-4 Sense Inputs**, and if any show an ON condition, the ISM4 will output the **OFF Macro** associated with *that Source*.

The **Source LED’s** will flash, by **Source**, when the **OFF Macros** are being sent. The **Front Panel Source 1-4 LED’s** will turn off to indicate a sensed OFF condition for *each Source*. If for some reason a particular Source does not respond to an OFF Macro, the ISM4 will resend that macro. The ISM4 will resend an OFF Macro up to five times. During the resends, the **ISM4 Program LED** will flash **red** indicating that an error has occurred in executing an **OFF Macro** and that the Source for which the macro is being resent is out of sync with the system.

The ISM4 will continually scan the **Sense Inputs**. As long as **Source 1** is OFF (System OFF Mode), if any of **Sources 2-4** turns ON, for any reason, the ISM4 will automatically output the **OFF Macro** for *that Source*, keeping all Sources synced to the **System OFF Mode**.

RC68 Triggered Commands

Externally, the ISM4 will behave in exactly the same manner as described in the Sections: **System ON Mode** and **System OFF Mode**, when triggered by **RC68 Trigger Commands**. Internally if the ISM4 ‘sees’ the **RC68 Source 1 ON Command** it will look at the state of **Source 1**. If it is OFF the ISM4 will enter **System ON Mode** as described. Conversely, if the ISM4 ‘sees’ the **RC68 Source 1 OFF Command** it will look at the state of **Source 1**. If it is ON the ISM4 will enter **System OFF Mode** as described. If the ISM4 ‘sees’ the **RC68 Toggle Power Command**, it will look at **Source 1** determine the state (ON or OFF) and output the **opposite state macro**.

Please Note that unlike the case of a “Sense In” trigger on Source 1, the IR content of Command Structure number 1 on either the ON and OFF macro will be executed.

RS232 Triggered Commands

Externally, the ISM4 will behave in exactly the same manner as described in the Sections: **System ON Mode** and **System OFF Mode**, when triggered by **RS232 Trigger Commands**. Internally if the ISM4 'sees' the **RS232 Source 1 ON Command** it will look at the state of **Source 1**. If it is OFF the ISM4 will enter **System ON Mode** as described. Conversely, if the ISM4 'sees' the **RS232 Source 1 OFF Command** it will look at the state of **Source 1**. If it is ON the ISM4 will enter **System OFF Mode** as described. If the ISM4 'sees' the **RS232 Toggle Power Command**, it will look at **Source 1** determine the state (ON or OFF) and output the **opposite state macro**.

Please Note that unlike the case of a "Sense In" trigger on Source 1, the IR content of Command Structure number 1 on either the ON and OFF macro will be executed.

APPENDIX

NAVIGATING AND EDITING MACROS

The six Front Panel Buttons each have multiple functions, depending upon the ISM4 Mode. The following sections detail those functions within the different modes. An understanding of the button presses will help make the programming process easier. For the actual programming instructions, see Section: **Programming Macros**.

Normal Operating Mode

In Normal Operating Mode the Front Panel Buttons are typically not used. They are used in this mode to clone a new ISM4 and to enter Edit Mode.

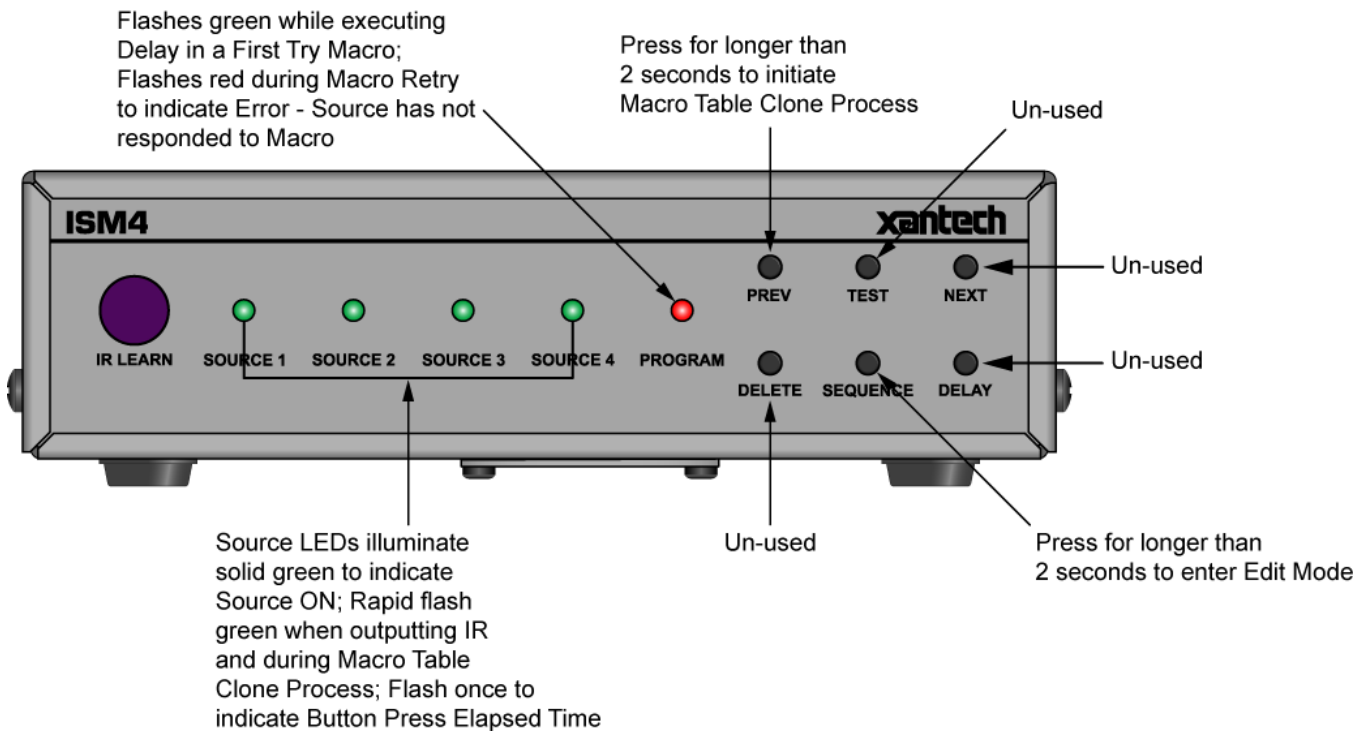


Figure 9 Front Panel Navigation – Normal Operating Mode

- PREV** In **Normal Operating Mode**, press for **2 seconds** (Indicated by the first blink of the Active Source LED) to initiate the **Macro Table Clone Process**. This will transfer the programming from one ISM4 to another. **Macro Table Clone** requires that both units are properly connected via their **RS232 Ports**. **All Source LED's** will rapid flash green during the Macro Table Clone Process.
- SEQUENCE** In **Normal Operating Mode**, press for **2 seconds** (Indicated by the first blink of the Active Source LED) to put the ISM4 into **Edit Mode**. By default, the **Source 1** and **Program LED's** will illuminate **green** to indicate **Edit Mode**.

In **Normal Operating Mode** the *other* Front Panel Buttons have **no functions**.

In **Normal Operating Mode**, a **Source LED** will illuminate solid **green** when the associated Sense Input 'sees' a Sensor Control Voltage from a connected Sensor Module when the sensed source is ON and turn off when the Sensor Control Voltage is cut when that same source is OFF.

Edit Mode - Navigate Macros

Press the Front Panel **Prev** or **Next** Buttons and observe the LED's to **navigate** Source ON and OFF Macros as follows:

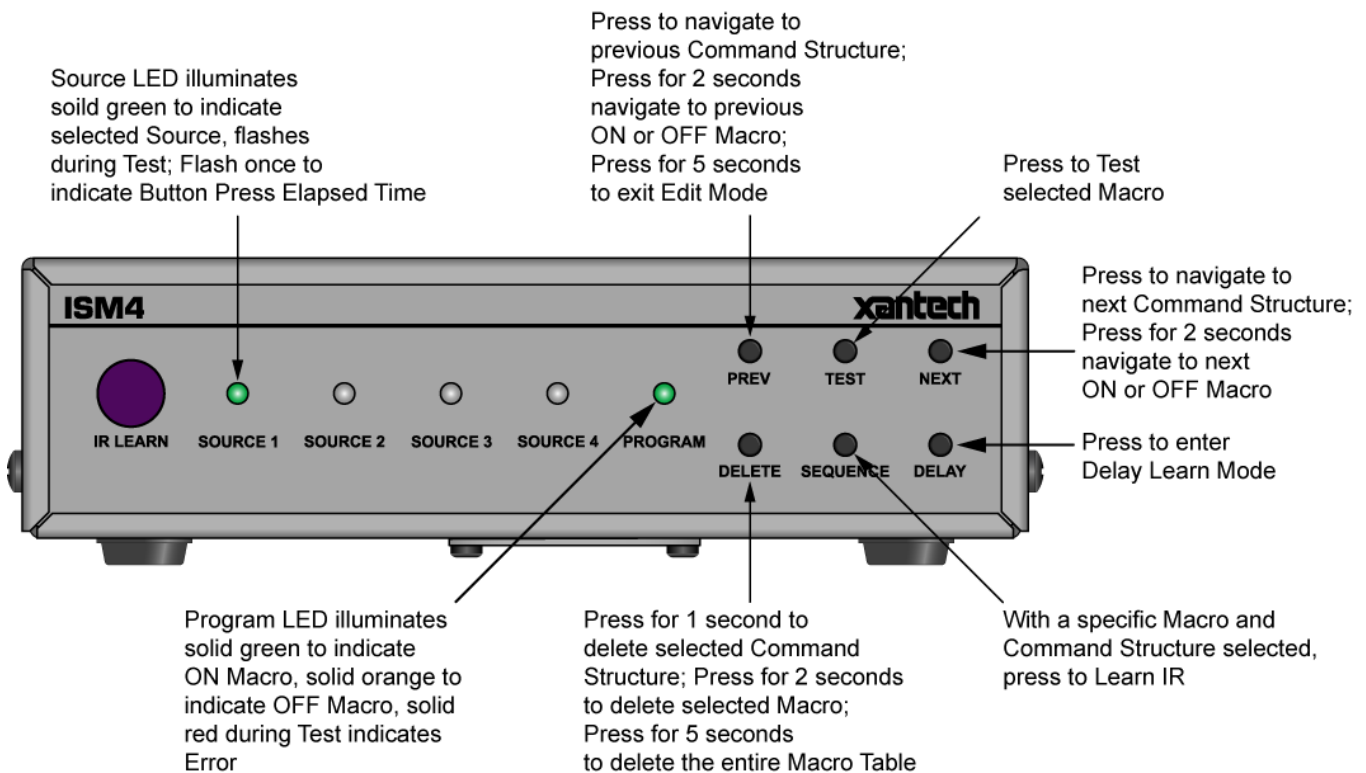


Figure 10 Front Panel Navigation – Edit Mode (Navigating Macros)

- SEQUENCE** In **Normal Operating Mode**, press for **2 seconds** (Indicated by the first blink of the Active Source LED) to enter **Edit Mode**. This will allow navigation of **Source ON** and **OFF Macros**. The **Source 1** and **Program LED's** will illuminate solid **green**, by default, to indicate **Edit Mode, Source 1 ON Macro** selected. **Source 1 LED green** and **Program LED orange** indicates **Source 1 OFF Macro** selected. **Source 2 LED green** and **Program LED green** indicates **Source 2 ON Macro** selected. **Source 2 LED green** and **Program LED orange** indicates **Source 2 OFF Macro** selected, etc.
- PREV** In **Edit Mode** a quick **1 second** press will Navigate to the previous **Command Structure**. A press of **2 seconds** (Indicated by the first blink of the Active Source LED) will navigate to the **previous ON or OFF Macro**. Wait for the **Source LED** of the newly selected **Command Structure or Macro** to **flash** once before pressing any more buttons. To exit **Edit Mode** and enter into **Normal Mode** press the **PREV** button for 5 seconds (Indicated by the second blink of the Active Source LED) or cycle power off and on.
- NEXT** In **Edit Mode** a quick **1 second** press will navigate to the next **Command Structure**. A press of **2 seconds** (Indicated by the first blink of the Active Source LED) will navigate to the **next ON or OFF Macro**. Wait for the **Source LED** of the newly selected Macro to **flash** once before pressing any more buttons.
- TEST** In **Edit Mode** press to **Test** the selected **Source ON or OFF Macro**. **Emitters** must be connected to the **ISM4** and appropriate **Sources** to test **Macros**.
- DELETE** In **Edit Mode**, a quick **1 second** press will **delete** the current **Command Structure**. A **2 second** press (Indicated by the first blink of the Active Source LED), will delete the current **Macro**. A press of **5 seconds** (Indicated by the second blink of the Active Source LED) will **delete** the entire **Macro Table** (all Macros).

- DELAY** In **EDIT MODE** a press of the **DELAY** button will cause the ISM4 to enter into **DELAY Learn Mode**. This will allow the programmer to program a **delay** within a particular **IR Command Structure**, even if there is no associated IR command in that Command Structure.
- SEQUENCE** In **Edit Mode**, with a **Source ON** or **OFF Macro** selected, press to initiate the **IR Learn Mode**.
- PREV** In **Edit Mode** press for 5 **seconds** (Indicated by the second blink of the Active Source LED) at any time to exit **Edit Mode** and return to **Normal Operating Mode**.

IR Learn Mode

Press the Front Panel Buttons and observe the LED's to **program** Source ON and OFF Macros as follows:

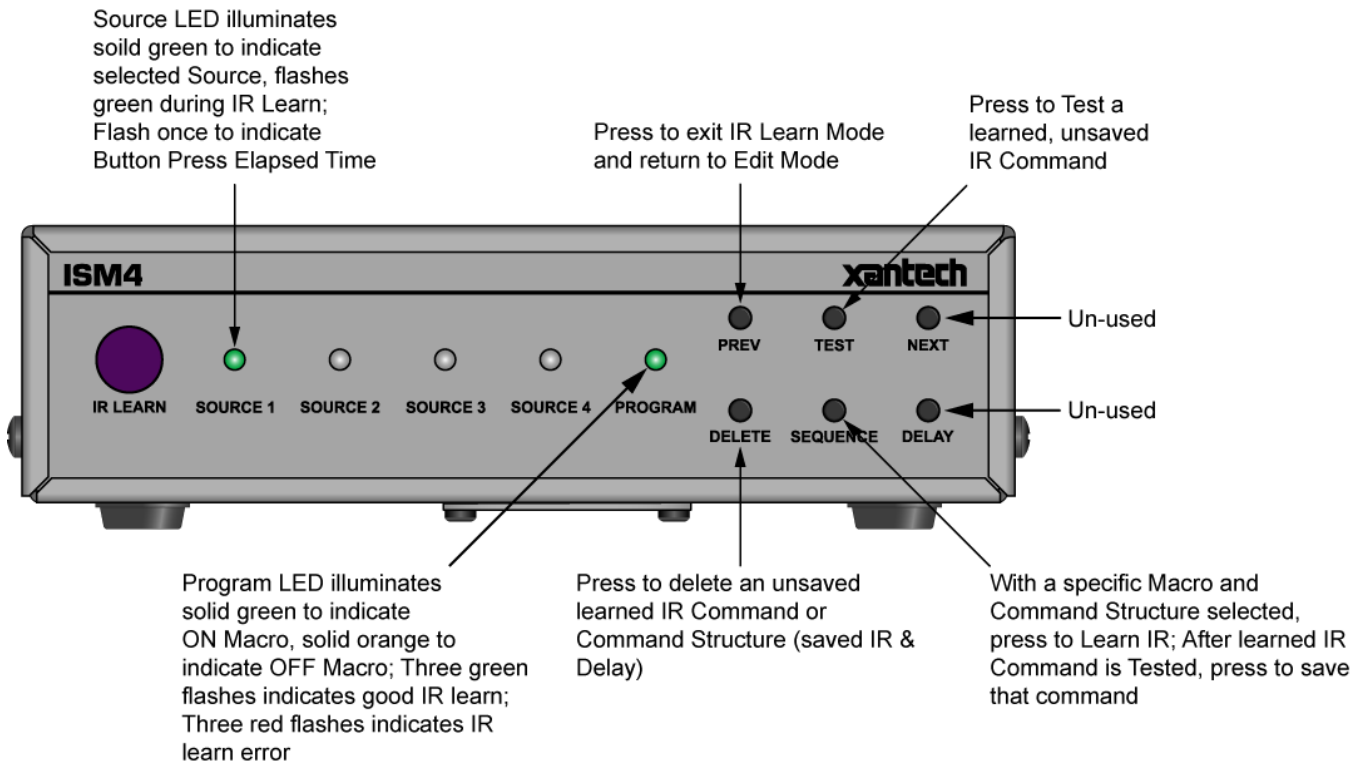


Figure 11 Front Panel Navigation – IR Learn Mode

- TEST** In **IR Learn Mode** press to **Test** a just learned and unsaved **IR Command**. The **Source LED** for the **Macro** containing the **learned command** will flash **green**. The **Program LED** will blink once to indicate that the IR waveform was generated without error. It will blink red otherwise. This does not indicate that the IR waveform was successful in controlling the Source component. It is simply an indication of the validity of the IR data. The **Program LED** will return to its previous state after the command has been sent. **Emitters** must be connected to the **ISM4** and appropriate **Sources** to test **IR Commands**.
- SEQUENCE** In **IR Learn Mode**, press to save a learned and tested **IR Command**. This action will automatically exit IR Learn Mode and enter Edit Mode. Recall that full navigation on a Command Structure and Macro level is permissible in Edit Mode.
- DELETE** In **IR Learn Mode**, press to delete a non-functioning, learned but **unsaved IR Command**. The **ISM4** will automatically go back into **Learn Mode** to re-learn the command just deleted. (Same **Macro** and **Command Structure** location.) If deleting a **Command Structure** (saved IR and Delay) the **Program LED** will flash **green** once and return to its previous state. Press **Sequence** to re-learn the **IR Command** for the deleted **Command Structure**.
- DELAY** Not used in **IR Learn Mode**.
- PREV** In IR Learn a press of the **PREV Button** will cause the **ISM4** to exit IR Learn Mode and enter **Edit Mode**.

NEXT Not used in this **IR Learn Mode**.
PREV If not save of any learned IR is desired, press to return to **Edit Mode**.

Delay Program Mode

Press the Front Panel Buttons and observe the LED's to program Delays in Command Structures as follows:

NOTE: Upon entering **Delay Edit Mode**, the Delay Value is reset to **0 seconds**.

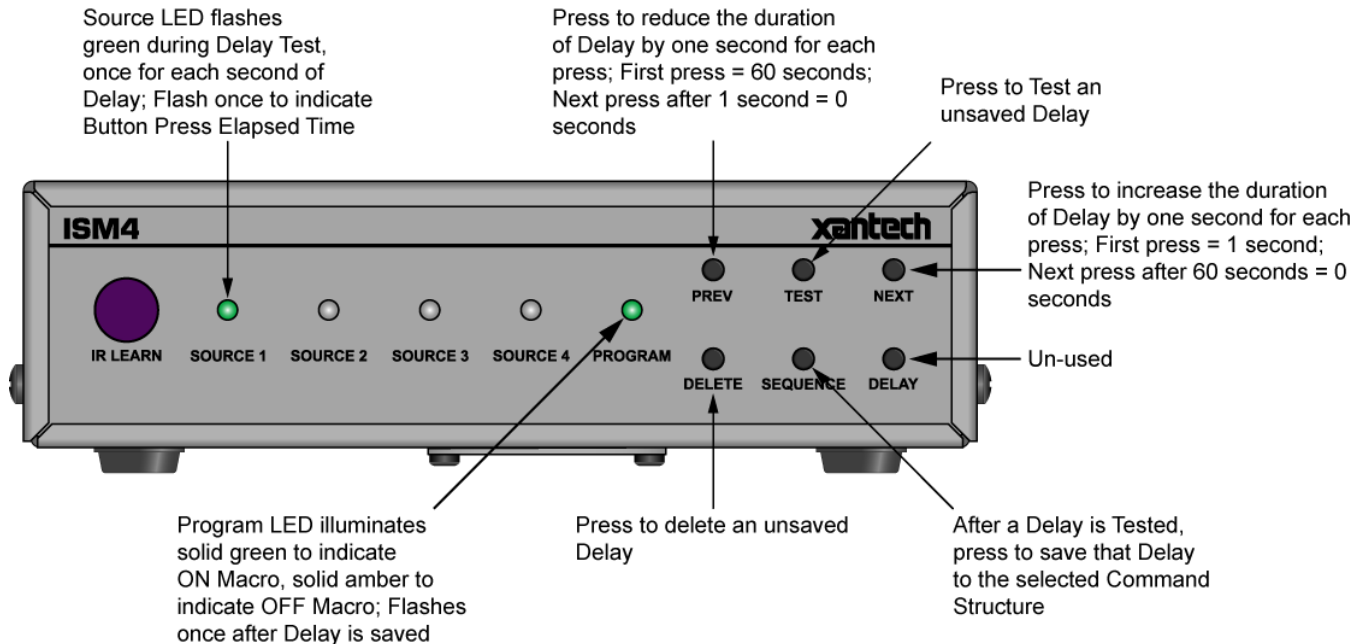


Figure 12 Front Panel Navigation – Delay Program Mode

DELAY Not used in this **Delay Program Mode**.
NEXT In **Delay Program Mode** each press will **increase** the amount of **delay** by **one second** from **0-60 seconds**. After **60 seconds** a press of the **Next Button** will set the delay to **0 seconds**.
PREV In **Delay Program Mode** each press will **decrease** the amount of **delay** by **one second** from **0 to 60 and down to 0 second**. After **0 seconds** a press of the **Prev Button** will set the delay to **60 seconds**.
TEST After a **delay** duration has been selected, but **not saved**, a press of the **Test Button** will initiate the **delay**. The currently selected **Source LED** will **flash** the number of times equal to the duration of the delay.
DELETE Press to **remove delay** value in the currently selected **Command Structure**.
SEQUENCE Press to **save a delay** to a **Command Structure**. This action will automatically exit IR Learn Mode and enter Edit Mode. Recall that full navigation on a Command Structure and Macro level is permissible in Edit Mode.

SPECIFICATIONS

Dimensions	5.25 W x 2.875 D x 1.6525 H (133.35 x 73.025 x 42mm)
Weight	0.76 lbs (0.34 kg)
Power	2.1mm coaxial jack 12V DC @ 0.5A
IR Learning Bandwidth	30KHz-100KHz
Macros	
ON Macros	4
OFF Macros	4
Sensor Jacks	4 – Stereo 3.5mm mini jacks
Emitter Jacks	4 – 3.5mm mini jacks
IR Receiver Jack	1 – Stereo 3.5mm mini jack
IR Control In Jack	1 – 3.5mm mini jack
RS232	
RS232 Port	1 – Stereo 3.5mm mini jack
Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	1
Flow Control	None

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Installation and Programming Manual, ISM4 Intelligent System Manager
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